LAND POTENTIAL STUDY

PAMLICO COUNTY, NORTH CAROLINA

ABSTRACT

TITLE: Land Potential Study for Pamlico County, North Carolina

AUTHOR: State of North Carolina, Department of Conservation and Development, Division of Community Planning

SUBJECT: Climate, Geology, Ground Water, Surface Water, Pollution, Topography, Natural Drainage, Existing Land Uses and Transportation as They Create Potential For or Influence Future Development

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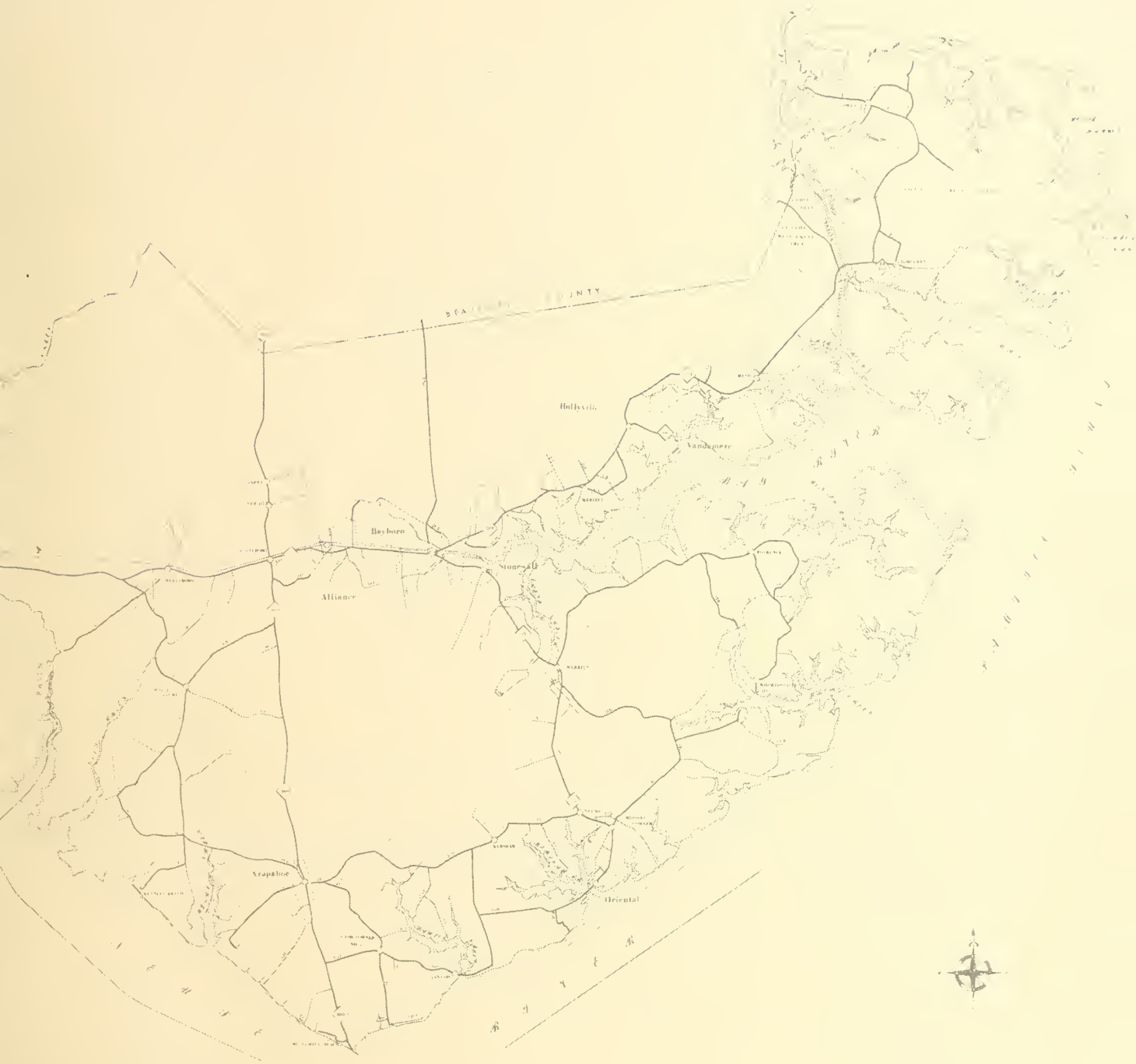
ABSTRACT: The physical, topographical and cultrual features of Pamlico County that create a potential for or influence future development are determined with the limitations of each. It is determined that the most restrictive item is transportation. The county is on a peninsula with unbridged bodies of water on three sides. Other limiting factors are soils and drainage. The majority of soils are unsuitable for septic tank use and the land is poorly drained due to the fact that it is extremely flat. There is no public water or sewer system in the entire county.

Much undeveloped land is available. The temperate climate is conducive to development. Also, adequate ground water is available of an acceptable quality. The surface water has a potential for boating, fishing, bathing and waterfowl hunting. Most of the soils are suitable for agricultural and forestry purposes.



LAND POTENTIAL STUDY

PAMLICO COUNTY, NORTH CAROLINA

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INTRODUCTION

In March of 1965, the Pamlico County Commissioners established the Pamlico County Planning Board and appointed five county residents as members. The statutory duties of the Planning Board are to make careful studies of the resources, possibilities, and needs of the county, particularly with respect to conditions which may be injurious to the public welfare or otherwise injurious, and to make plans for the development of the county. With the aid of these studies and plans, the Planning Board makes recommendations to the County Commissioners which will aid the county's orderly growth and development.

Pamlico County contracted with the Division of Community Planning of the North Carolina Department of Conservation and Development in January of 1968 for technical assistance in preparing a comprehensive plan for the physical and economic development of the county. Specifically, the contract consists of five work elements which are as follows:

Land Potential Study
Economic Potential Study
Land Development Plan
Community Facilities Plan
Subdivision Regulations

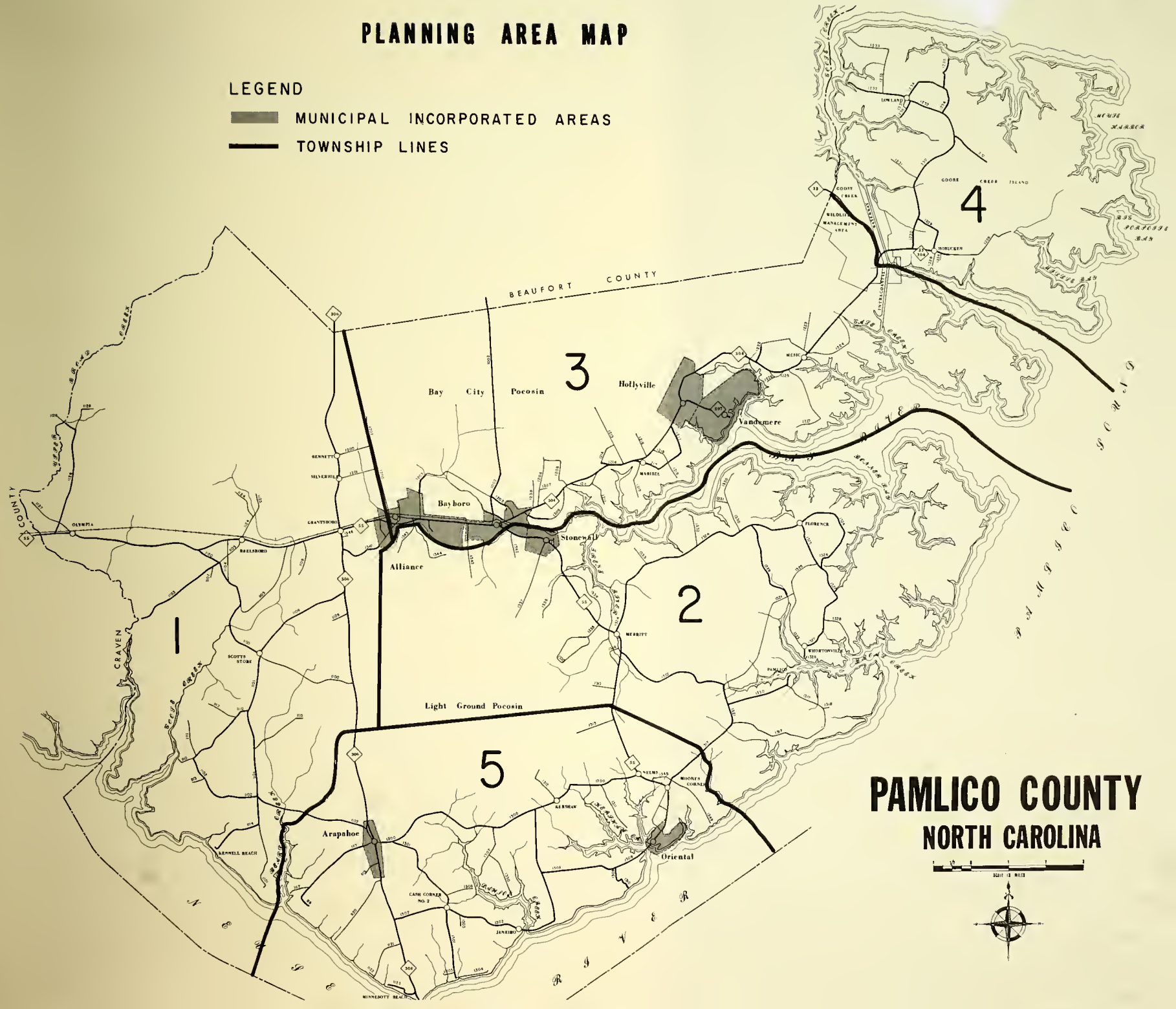
This publication, the Land Potential Study, is the first to be completed under the contract. Its purpose is to determine those physical, topographic, and cultural features of the county that create a potential for or will influence future development.

Among these features to be considered are soils and their suitability for various uses, ground and surface water, climate, drainage basins and areas subject to flooding, as well as existing land use, major transportation routes and facilities, and public utilities. Because this study is the first element of the contract to be completed, it will contain other information of general interest such as a brief history, the regional setting and geography, and a description of political subdivisions (townships and incorporated areas) within the county.

PLANNING AREA

The Planning Board is authorized to make plans for all lands within the boundaries of the county. However, the county does not have the authority to implement these plans within any incorporated town in the county or in its extraterritorial jurisdiction. This duty belongs to the legislative bodies of the towns. The incorporated towns may place themselves within the jurisdiction of the county, however. Once a town has accepted the county authority, it cannot retract the acceptance without twelve months written notice. It is the county planning board's duty to assure its efforts are in line generally with those of the local planning boards. The county has seven incorporated areas and is subdivided into five townships. (See planning area map on page 3 for incorporated areas and township lines).

PLANNING AREA MAP

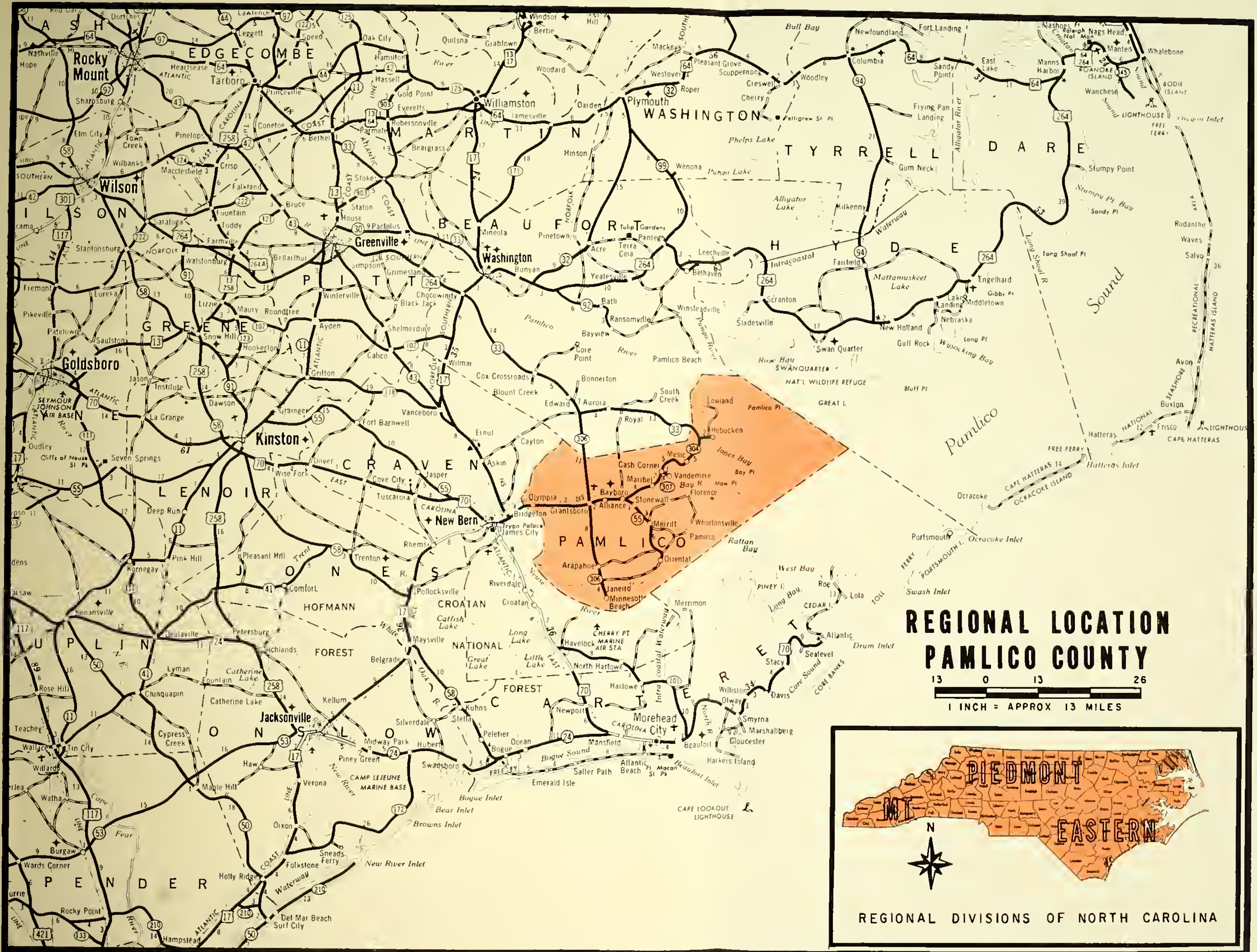


PAMLICO COUNTY
NORTH CAROLINA

HISTORY AND REGIONAL SETTING

Pamlico County lies in the extreme eastern part of North Carolina located on a broad, flat, eastward-sloping plain that represents a former ocean floor. This plain or terrace is named the Pamlico Terrace and is one of a series of marine terraces formed by successively lower stands of the sea during Pleistocene time. The extreme western part of the county lies on a higher marine terrace, the eastern limit of which is marked by a well defined beach ridge that extends in a north-south line that is parallel to N.C. 306. The county is part of a peninsula. The peninsula is bounded by the Pamlico River on the north, by the Neuse River on the south, and by the Pamlico Sound on the east. The county is bounded on the north by Beaufort County and the Pamlico River, on the east by the Pamlico Sound, on the south by the Neuse River, and on the west by Craven County. It is located approximately 110 miles east of Raleigh, N. C., 130 miles south of Norfolk, Virginia, and 25 miles inland from the Outer Banks.

The area of the peninsula which is now Pamlico County was settled in the 17th century. Although there was early settlement, the area grew slowly due to its geographical isolation. Due to the wide bodies of water surrounding the county and to the extensive swamps of the peninsula, north-south travel went inland, thus by-passing Pamlico County. The county, created in 1872, covers 341 square miles and had a 1960 population of 9,850.



REGIONAL LOCATION
PAMLICO COUNTY
13 0 13 26
1 INCH = APPROX 13 MILES
REGIONAL DIVISIONS OF NORTH CAROLINA
MT
PIEDMONT
EASTERN
N
EDGECOMBE
MARTIN
WASHINGTON
TYRRELL
DARE
WILSON
PITT
BEAUFORT
HYDE
GREENE
LENOIR
CRAVEN
PAMLICO
JONES
DUPLIN
ONSLOW
CARTERET
PENDER
Rocky Mount
Tarboro
Williamston
Plymouth
Wilson
Greenville
Washington
Goldsboro
Kinston
New Bern
Jacksonville
Morehead City
Beaufort
Bayboro
Oriental
Pamlico Sound
CROATAN NATIONAL FOREST
HOFMANN FOREST

CLIMATE[1]

Pamlico County, like most coastal counties in North Carolina, has a mild and temperate climate. The county's proximity to the Pamlico Sound and the Atlantic Ocean is a factor which greatly influences its climate. As a result, the county has higher winter temperatures than do the inland counties, and the heat of summer is often tempered by sea breezes. In addition, the average annual precipitation is somewhat higher in Pamlico and other coastal counties than in the inland counties.

In Pamlico County, as well as other coastal counties, precipitation is fairly well distributed throughout the year. The average annual precipitation for the area is approximately 56 inches. The maximum precipitation occurs in July which averages 8.17 inches. October, on the other hand, is the month with minimum precipitation, averaging 3.17 inches. Sleet and snowfall rarely occur and average less than two inches per year.

The average annual temperature for the county is about 64°. Seasonal variances in temperature are moderate with a July average of 80.2° and a January average of 46.6°. Generally, the period from March 22 through November 12 is free of freezing temperatures. This provides the county with a growing season of approximately 240 days.

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[1]Source: Weather and Climate in North Carolina, North Carolina State University, Agricultural Experiment Station, Bulletin 396, December, 1964.

The prevailing wind direction is northeast during the months of September, October, and November and southwest during the remainder of the year. Destructive winds are infrequent in the area but do occur in connection with hurricanes which pass near or across the coastal area of the State. A more menancing threat posed by these tropical storms is water damage which is largely attributed to abnormally high tides. This factor is considered in delineating flood plains in the county. (See flood plains map on page 23.

GEOLOGY AND GROUND WATER[1]

Information concerning the location, quality, and quantity of ground water in Pamlico County is important and of particular interest when considering the potential that water supply creates for future development. The reason for the particular interest in ground water is that all water supplies in the county, both in urban and rural areas, are obtained from wells. The reason for the extensive use of ground water as a supply is that surface water is of such quality that it is unusable as a source of supply. The quality of surface water is inadequate for two reasons. First of all, most of the surface water is brackish with a chloride content in excess of 500 ppm; hence, the water is not acceptable for domestic use. In addition, the surface waters

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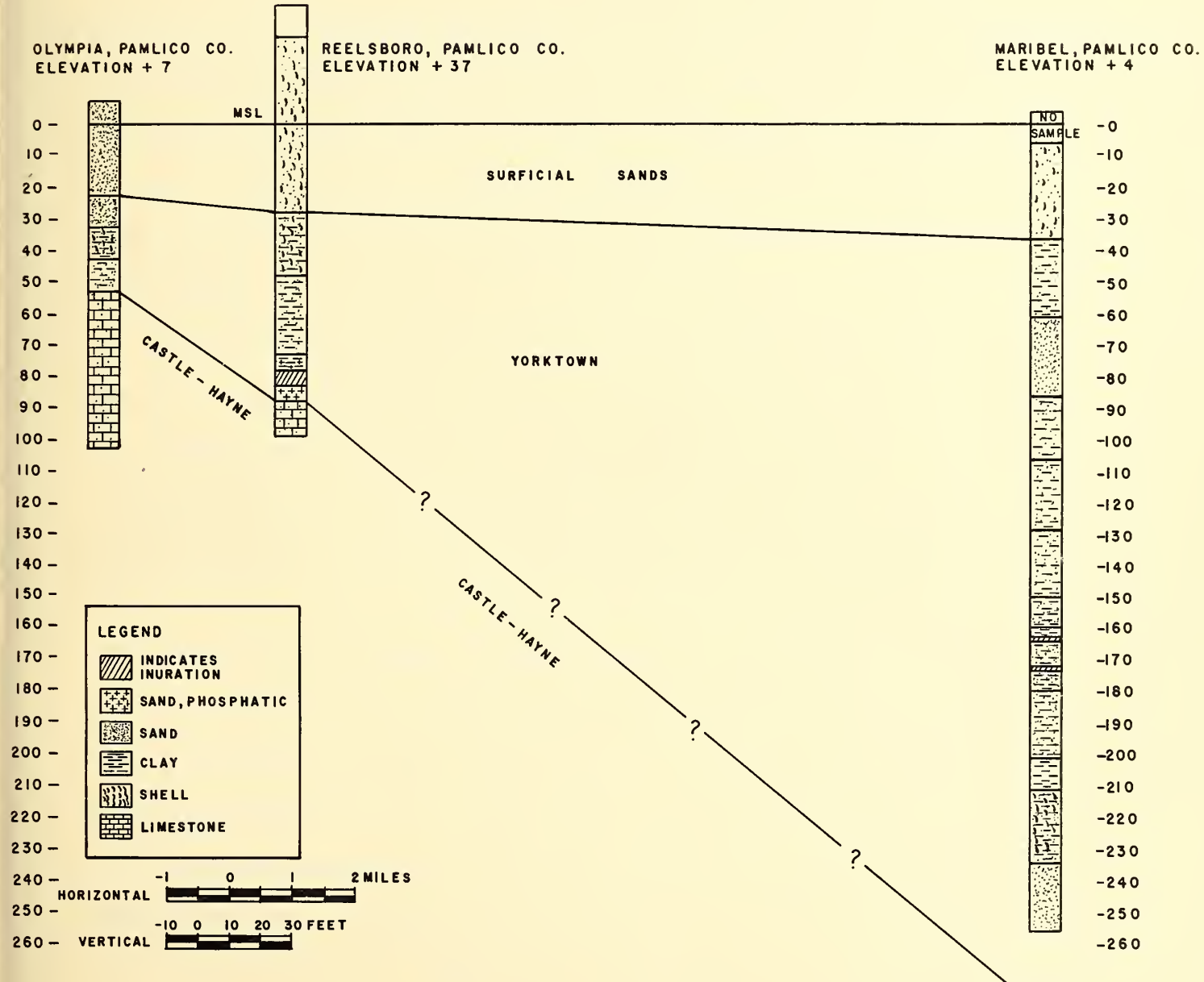
[1]Source: Geology and Ground Water Resources of the Swanquarter Area, N.C. Department of Water Resources, Bulletin Number 4, 1964.

GEOLOGIC CROSS SECTION - PAMLICO COUNTY



which are not brackish (these include only the upstream branches of Upper Broad Creek and Goose Creek) are unacceptable because their chemical composition is such that treatment will not render the water acceptable for domestic use.

Across the United States as well as in North Carolina, the consumption of water for industry, irrigation, and personal use is continuously increasing. As Pamlico County develops, this increasing demand for water will be present in the county. In order to determine the potential or restrictions that the water supply has for future development, it is necessary to examine both the quality and quantity of ground water relative to the geologic formation in which each aquifer is located.

In Pamlico County, ground water is obtained from three major geologic formations which include the Castle Hayne limestone formation, the Yorktown formation, and the surficial sands formation.

The Castle Hayne limestone formation underlies the other two formations. The top section of this formation is located at various levels below ground surface. In the western section of the County, the formation is located about 50 feet below ground surface while in the extreme eastern section, it is located approximately 300 feet below land surface. Also, the thickness of the aquifer varies from 200 to 400 feet.

Because limestone is porous and permeable, this aquifer produces large quantities of water. Small domestic wells obtaining water from this formation are capable of yielding from 20-50

gallons per minute while large diameter wells may yield several hundred gallons per minute. The water is generally of good quality with a low iron and chloride content. The iron content ranges from 0.06-0.50 parts per million while the chloride content ranges from 10 to 40 parts per million. On the other hand, the water usually has two objectionable characteristics. In addition to being very hard, water from the Castle Hayne formation, in the eastern part of the county, emits a strong odor of hydrogen sulfide. (See Table 1 for the effect of these characteristics).

The Yorktown formation lies between the Castle Hayne and the surficial sand formations. The upper level of this formation is located from 25 to 35 feet below ground level throughout the entire county. In addition, the formation varies in thickness from 30 to 250 feet. Domestic wells utilizing the formation produce moderate quantities of water which range from 5 to 20 gallons per minute. Water quantity is generally fair even though it is high in iron content and hardness. (See Table 1 for the effect of these characteristics). The chloride content usually ranges from 10 to 40 parts per million; however, in areas where the formation is adjacent to bodies of saline water, higher concentrations of chloride are present.

The remainder of the ground water supply is obtained from the surficial sands formation which covers the entire county and overlies the Yorktown formation. This non-artesian acquifer, varying in thickness from 20 to 40 feet, is most extensively

used as a source of water supply in the western part of the county. Only in this area is the formation thick enough to provide an adequate source of supply for shallow dug or driven domestic wells. Shallow wells in the formation vary in depth from 15 to 20 feet with a yield ranging from 5 to 15 gallons per minute.

Water from the formation is generally fair in quality. Even though the water is generally soft and free of odor, it has several objectionable characteristics which are slight acidity, high iron content, and corrosiveness. (See Table 1 for the effect of these characteristics). In addition, slight quantities of chloride are present where the aquifer is hydraulically connected with saline water of the sound and rivers.

Now that the location, the quality, and the quantity of ground water in each geologic formation has been examined, certain conclusions can be drawn concerning the potentials and the restrictions that ground water has for development in Pamlico County. The types of development most dependent on and associated with ground water are residential and industrial development.

In order to determine the geologic formation which provides the best quality of ground water supply for residential development, Table 1 was devised to compare the recommended limits of chemicals and physical properties for domestic use with the chemical and physical properties which are present in the water supply from each formation. As this comparison reveals, the Castle Hayne limestone formation contains the best quality water for

residential development. Although water from the aquifer is hard, its iron content is within the recommended limit. In addition to high water quality, the Castle Hayne formation produces the largest quantity of water of the three formations which also makes its supply the most acceptable for residential development. On the other hand, the Yorktown formation water supply has a limited potential for residential development because of its hardness, high iron content, and moderate quantity. Waters from the surficial deposits are slightly acid, very high in iron content, and corrosive which make it undesirable for residential use.

The quality of water required for industrial uses is so variable, depending on the particular industry involved, that it is impossible to establish specifications to fit all industrial uses. However, most industries generally require water that is clear, low in mineral content, soft, and available in large quantities. When these general requirements are considered, the best potential supply of ground water for industrial use is contained in the Castle Hayne formation because of its good quality and large quantity. The presence of iron, hardness, and odor (caused by hydrogen sulfide) pose some problems for industrial uses, but limited treatment of the supply would remove these undesirable characteristics and render it acceptable for most industrial uses.

Water from the Yorktown and the surficial sands formations are generally unacceptable for industrial uses. The Yorktown formation is unacceptable because of its high concentrations of

iron and its small quantity, while water from the surficial sands formation is unacceptable because of its small quantity and corrosiveness.

The only mineral resource extracted in the county is a small amount of sand and gravel. In 1966, only 3,000 tons of sand and gravel was produced in the county at an estimated value of $1,000.

TABLE 1

COMPARISON OF RECOMMENDED CHARACTERISTICS OF GROUND WATER FOR DOMESTIC USE WITH EXISTING CHARACTERISTICS

	CHEMICAL AND PHYSICAL PROPERTIES THEIR EFFECTS AND RECOMMENDED LIMITS		CHEMICAL AND PHYSICAL PROPERTIES OF WATER FROM MAJOR FORMATIONS		
Constituents and Properties	Effects of Excessive Quantities	Recommended limits for domestic use	Hayne Limestone	Surficial Sands	Yorktown
Iron (Fe)	Bitter, metalic taste. Stains fabrics, porcelain. Promotes growth of "iron" bacteria.	0.3 ppm	.06 ppm	3.0 ppm*	.87 ppm*
Manganese (Mn)	Metalic taste Stains fabrics, porcelain Deposition in pipelines, etc.	0.05 ppm	.00 ppm	.01 ppm	.00
Sulfate (SO4)	Laxative effects Salty taste	250 ppm	1.0 ppm	5.8 ppm	1.0
Chloride (CL)	Salty taste Corrosive	250 ppm	8.0 ppm	9.0 ppm	13
Fluoride (F)	Causes mottling of children's teeth, however, in optimum quantities (.8-1.2 ppm) effective in preventing dental cavities	1.5 ppm	.6 ppm	.1 ppm	.3
Nitrate (NO_3)	Possible infantile nitrate poisoning Indicate pollution of supply	45 ppm	.0 ppm	.5 ppm	.0
Hardness	High soap consumption Scale on heated vessels and pipes	0-60 ppm - soft 60-120 ppm - moderately hard 120+ppm - hard	172 ppm*	18 ppm	301*
Dissolved Solids	Represents total mineral and organic material dissolved in water	500 ppm	249 ppm	46 ppm	375

*Chemical and physical properties exceed recommended limits for domestic use.

SURFACE WATER

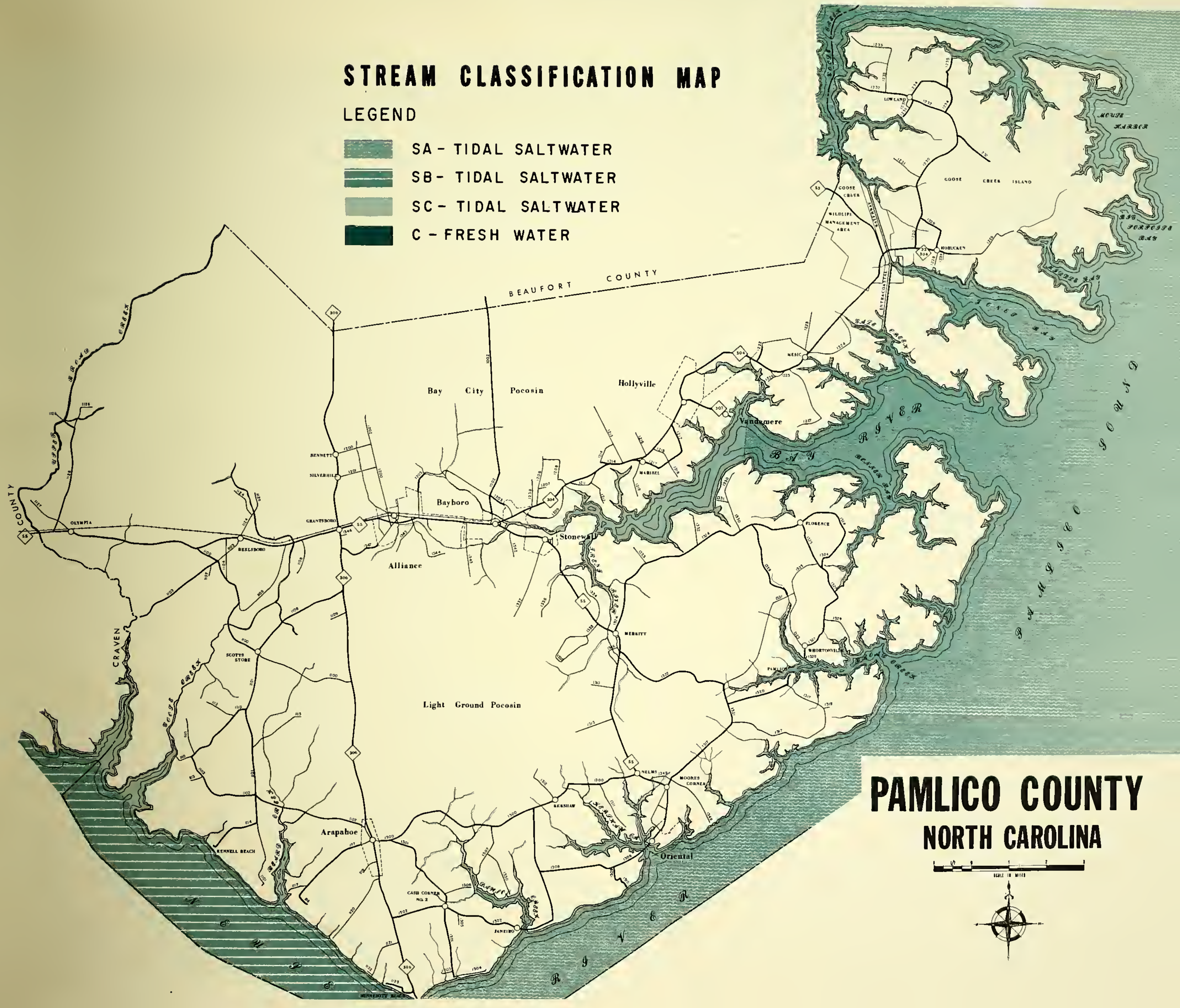
Pamlico County's surface water consists of the Neuse River on the south, the Pamlico River on the north, and the Pamlico Sound on the east as well as many other streams, creeks, and bays which are tributary to these three large bodies of water. Due to high salinity, these surface waters of the county are unusable for municipal and industrial purposes. However, certain uses can be and are being made of these saline waters which have great potential for growth and development of Pamlico County. Among these uses are outdoor bathing and recreation, fishing and fish propagation, and shellfishing for market purposes. The map on page 19 depicts the major surface waters in the county and indicates the classification assigned by the State Stream Sanitation Committee. The assignment of classifications to the various surface waters is based on the existing or contemplated best usage of the waters. In order to identify the best usage associated with the various classification, a brief explanation of each classification is given below.

Class	Suitability
C(Swp)	Fresh waters which are suitable for fish and wildlife propagation and any other usage requiring waters of a lower quality.
S A	Saline waters which are suitable for shellfishing for market purposes and any other usage requiring waters of a lower quality.

S B	Saline waters which are suitable for outdoor bathing and recreation and any other usage requiring waters of a lower quality.
S C	Saline waters which are suitable for fishing and fish propagation and any other usage requiring waters of a lower quality.

POLLUTION

At a time when the pollution of streams and rivers throughout the United States is so prevalent, Pamlico County is fortunate in having few pollution problems. In order to keep abreast with the pollution problem, the North Carolina Department of Water and Air Resources periodically inspects facilities of suspected polluters and maintains records of the offenders. These records indicate no major polluters in the county; however, several minor pollution problems do exist. The Town of Bayboro which is without a public sewerage system, pollutes an area of the Bay River from Bayboro downstream to Vandemere. The pollution in this area, however, has been less intense in the last several years due to the installation of sewage treatment lagoons at the two public schools in the area. Still another area with minor pollution problems is the area around the Town of Oriental. The absence of a municipal sewage treatment system, the practice of overboard sewage disposal by boats docking around the area, and the discharging of byproducts of seafood processors are


STREAM CLASSIFICATION MAP
LEGEND
SA - TIDAL SALTWATER
SB - TIDAL SALTWATER
SC - TIDAL SALTWATER
C - FRESH WATER
BEAUFORT COUNTY
CRAVEN COUNTY
Bay City Pocosin
Hollyville
Vandemere
Bayboro
Stonewall
Alliance
Light Ground Pocosin
Arapahoe
Oriental
BAY RIVER
PAMLICO SOUND
NEUSE RIVER
GOOSE CREEK ISLAND
PAMLICO COUNTY
NORTH CAROLINA

factors which are responsible for this pollution and for the closing of the area for commercial shellfishing.

Although the existing pollution problems in Pamlico County are minor and remediable in nature, they could intensify as future growth takes place if proper sewage disposal and treatment are not initiated. Such controls would include municipal and community sewage treatment facilities for existing and new areas of development. At this time, a study is underway to determine the feasibility of a county wide water and sewer system. Specifically, the study will indicate those areas in the county where the population density is high enough to economically justify the installation of such facilities.

TOPOGRAPHY AND NATURAL DRAINAGE

Pamlico County, like most counties in eastern North Carolina, is relatively flat. The elevation above sea level ranges from 1 to 50 feet. The highest elevations are west of the beach ridge which is parallel to N.C. 306. In this area of the county, elevations range from 25 to 50 feet above sea level. The larger portion of the county lying east of the beach ridge has elevations from 1 to 25 feet with most of the elevation ranging from 2 to 15 feet.

The above information was obtained from topography maps published by the U.S. Geological Survey. These maps showing 5 foot contour intervals are the only contour maps of the county currently available, but they do not cover the entire county.

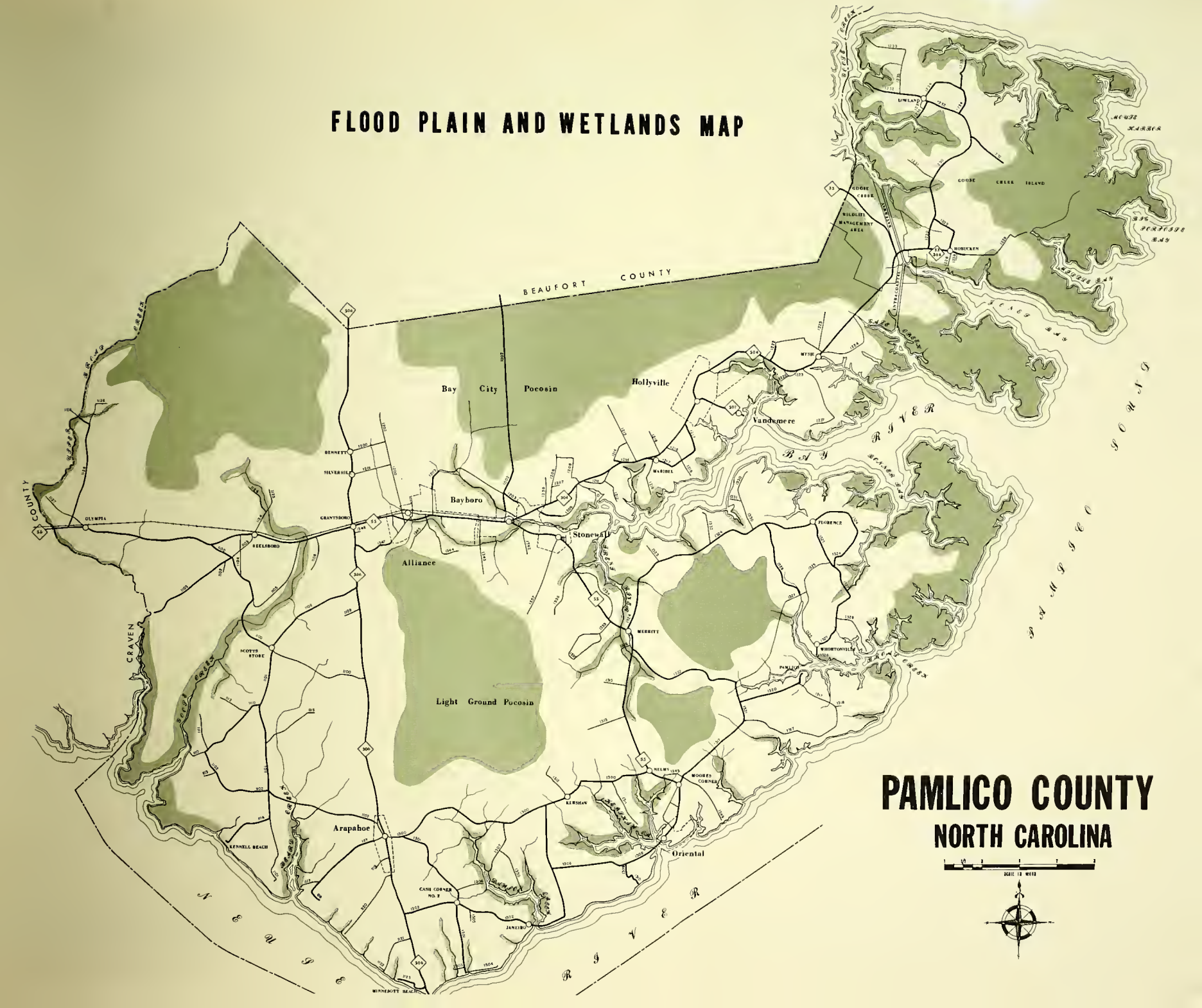
Contour maps are not available for the area of the county paralleling and lying north of the section of N.C. 55 from Olympia to Bayboro.

The most noticeable surface features in the county are the bluffs along the Neuse River and the pocosins which exist in the central, the northern, and the northwestern parts of the county. These pocosins are almost level interstream areas, in which there is a very slight slope from the center outward. As a result, these areas are very poorly drained. In the vicinity of Minnesott Beach, bluffs along the Neuse River range in height from 10 to 15 feet.

Only a small portion of the county is well drained. These well-drained areas are mostly confined to areas that border streams, particularly along the Neuse River where the slope of the land is most pronounced. Most of the county is artificially drained by small, open ditches which flow into canals or into natural outlets. For the most part, artificial drainage has been tied to agriculture and a Health Department program for mosquito control.

Topography and drainage are inhibiting factors in the development potential of Pamlico County. Natural drainage is inadequate due to the level characteristics of the terrain. The map on page 23 depicts those areas that are subject to flooding either because of inadequate drainage or because of elevation. These areas should be utilized for forestry, wildlife, and recreation purposes.

FLOOD PLAIN AND WETLANDS MAP



PAMLICO COUNTY

NORTH CAROLINA

SOILS[1]

Soils are probably the most important natural feature to consider in determining the best use of land. Soil characteristics such as percolation rate, shrink-swell ratio, load bearing potential, drainage, and slope obviously determine and affect the use and management of land. In order to designate the best use of land, the Pamlico County Planning Board needs general information concerning the location and the characteristics of soils in the county. This information has been provided by the Soil Conservation Service, U.S. Department of Agriculture. Upon the completion of a recent soil survey, the Soil Conservation Service grouped the soils in the county into seven soil associations. The soils that constitute an association are similar in origin, color, and structure. However, they may differ slightly in drainage, slope, and other characteristics that may affect soil management.

Each soil association normally consists of one or more major soils and at least one minor soil, and is named for the major soils in the order of their dominance in the association.

These seven soil associations are shown on the Generalized Soils Map on page 37. The map is intended for broad planning purposes only, and is not suitable for individual farm planning

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[1]Information provided by the Soil Conservation Service, U.S. Department of Agriculture, New Bern, North Carolina.

or building site locations due to the differences in soil characteristics within an association.

Soil interpretations based on the generalized soils map are shown in Table II. The table gives the suitability of the principal soils for general agricultural and forest uses. In addition, it also indicates the limitations of soils when used for nonfarm purposes, such as camp sites, picnic areas, intensive play areas, dwellings with septic tank absorption fields or sewerage systems, and foundations for light industries and roads. The table reveals that most of the soils in Pamlico County present moderate to severe limitations for most nonfarm uses. As a result, careful attention must be exercised in selecting areas of the county for future development.

A detailed description of the seven soil associations in Pamlico County is as follows:

1. LENOIR-CRAVEN ASSOCIATION

This association consists of smooth, nearly level divides unbecoming slightly rounded near drainageways. The areas of this association are dissected almost down the middle of the areas by a fairly deep drainageway with many shallow tributary drainages. The drainageways are narrow and have short side slopes ranging from gently to strongly sloping. This association makes up about 17 percent of the county. There are ten delineations in the county. The largest ones are around Olympia, between Scott's Store and Reelsboro, between Arapahoe and Broad Creek and the largest delineation is along Neuse River.

Lenoir soils make up about 40 percent of this association. They are somewhat poorly drained. The soils have dark gray very fine sandy loam surfaces and yellowish brown to light yellowish brown, very firm clay subsoils mottled with gray.

Craven soils make up about 30 percent of this association. They are moderately well drained. The soils have grayish brown very fine sand loam surfaces and yellowish brown, very firm clay subsoils mottled with gray in the lower subsoil.

The remainder of this association consists chiefly of soils of the Norfolk, Goldsboro, Lynchburg, Rains, Lumbee, Kalmia, Johns, Duplin, Dunbar, Coxville, Bladen, Leaf and Bibb series.

About half of this association is cultivated and some is pastured. The chief crops are corn, soybeans, tobacco and small grain. About 30 percent of this association is in Capability Class II, 50 percent in Class III and 20 percent in others. Wetness is the chief limitation to use and management of soils of this association but erosion is also a problem on the sloping areas near the drainageways. Bank erosion may be a problem on the Neuse River during hurricane tides. These soils are easily tilled except for the eroded places and crops respond well to recommended applications of lime and fertilizer. These soils have slow permeability and have only fair response to subsurface drainage.

Slow to very slow percolation and high water table are moderately to severe limitations for use of the major soils for urban development. Areas of some minor soils having only slight

to moderate limitations for urban uses are in small areas scattered in this association. The minor soils having more permeability are more desirable for urban uses and make better home sites than Lenoir-Craven soils.

2. LEAF-BAYBORO ASSOCIATION

This association consists of broad smooth flats in interstream areas. The areas of this association are dissected by only a few shallow drainageways. The association makes up about 24 percent of the county. The delineations are large and found in all parts of the county.

Leaf soils make up about 40 percent of this association. They are poorly drained. The soils have dark gray very fine sandy loam surfaces. The clay subsoils are gray mottled with brownish yellow and are very firm, very sticky and very plastic when wet.

Bayboro soils make up about 30 percent of this association. They are very poorly drained. The soils have black to very dark gray very fine sandy loam to loam surfaces and gray, firm, sticky and plastic when wet, clay subsoils.

The remainder of this association consists chiefly of soils of the Lenoir, Craven, Hyde, Nahunta, Dunbar, Coxville and Bladen series.

About two-thirds of this association is in woodland. The cleared areas are used for corn, soybeans, small grain and pasture. About 10 percent is in Land Capability Class II, 60 percent in Class III, and 15 percent in Class IV and 15 percent in

Class IV and 15 percent in others. Wetness is the chief limitation to use and management of the major soils of the association. A system of surface and subsurface drainage is required before Leaf and Bayboro soils can be cultivated and pastured. These soils are fairly easily tilled and crops respond well to recommended applications of lime and fertilizer. These soils have slow permeability and have only fair response to subsurface drainage.

The slow to very slow percolation and high water table are severe limitations for use of the major soils for urban development. Areas of some minor soils scattered in this association have only moderate limitations to urban uses and are more desiralbe places for building sites than the Leaf or Bayboro soils.

3. PORTSMOUTH-TORHUNTA ASSOCIATION

This association is of broad, smooth flats on wide interstream areas. The areas of this association have little natural drainage. The association makes up about 23 percent of the county. There are 12 delineations of this association. The areas are small and scattered over the west and northeast parts and a large area is in the central part of the county.

Portsmouth soils make up about 40 percent of this association. They are very poorly drained. The soils have black to very dark gray loam to sandy loam surfaces and gray, friable, sandy clay loam subsoils.

Torhunta soils make up about 20 percent of this association. They are very poorly drained. The soils have black to very dark

gray loam to sandy loam surfaces and gray, friable, sandy loam subsoils.

The remainder of this association consists chiefly of soils of the Rains, Weston, Lumbee, Lynchburg, Johns, Dragston, Coxville, Bayboro, Rutlege, Osier, Ponzer and Pamlico series.

About three-fourths of this association is in woodland. The few cleared areas are used for corn, soybeans and pasture. About 70 percent is in Land Capability III, 15 percent Class II, and 15 percent Class IV and V. Wetness is the chief limitation to use and management of the soils in this association. The Portsmouth and Torhunta soils respond well to drainage. When artificially drained, the soils are easily tilled and crops respond well to recommended applications of lime and fertilizer. A system of surface and subsurface drainage is required before these soils can be cultivated and pastured.

The high water table causes the major soils of this association to have severe limitations for urban uses. Some minor soils in this association have moderate limitations for urban uses and are more desirable for building sites than the major soils, Portsmouth and Torhunta.

4. LEON-LYNN HAVEN ASSOCIATION

This association consists of broad flats and low ridges on wide interstream areas. The areas of this association are only moderately dissected by shallow drainageways. The association makes up about 8 percent of the county. There are three delin-

eations of this association. They are in the western part of the county.

Leon soils make up about 40 percent of this association. They are somewhat poorly drained. The soils have dark grayish sandy surfaces and dark brownish, cemented, sand subsoils.

The remainder of this association consists chiefly of soils of the Rutlege, Osier, Chipley, Kenansville, Dragston, Weston, Torhunta, Lakeland and Blanton series.

About three-fourths of this association is in woodland. The cleared areas are used for Blueberry crops. About 65 percent is in Land Capability Class V, 20 percent Class III and 15 percent other classes. Wetness is the chief limitation to use and management of this association. Also, these soils have low natural fertility. The soils respond well to drainage, but caving in of sides of ditches makes good drainage difficult to maintain. These soils are easily tilled and crops respond fairly well to recommended applications of lime and fertilizer. Leon and Lynn Haven soils have poor response to management because of the sand texture and hardpan subsoil. A system of surface and subsurface drainage is required before the major soils of this association can be cultivated and pastured.

The wet condition of the major soils of this association is a moderate to severe limitation for urban uses. This association has minor soil inclusions that are small in areas, but have only slight limitations to urban uses.

5. KENANSVILLE-DRAGSTON ASSOCIATION

This soil association consists of broad, smooth nearly level to slightly convex divides becoming rounded near drainageways. The areas of this association makes up about nine percent of the county. There are 17 delineations of this association on the west side and central part of the county.

Kenansville soils make up about 30 percent of this association. They are well drained. The surface soil is grayish brown loamy sand 20 to 40 inches thick. Subsoil is thin and is light yellowish brown to strong brown, friable, sandy loam overlying course layers of loamy sand and sand.

Dragston soils make up about 20 percent of this association. They are somewhat poorly drained. The surface soil is dark gray loamy sand. Subsoil is pale brown to yellowish brown, friable, sand loam mottled with gray. The gray color increases in the lower subsoil.

The remainder of this association consists chiefly of soils of the Leon, Weston, Torhunta, Wagram, Lakeland, Chipley and Lynn Haven series.

About one-half of this association is cultivated and a small acreage is pastured. The chief crops are corn, tobacco, soybeans, small grain and truck crops. About 30 percent of the soils are in Land Capability Class II, 30 percent are in Class III and 20 percent Class V. The remaining 20 percent is in other classes. The soils are easily tilled and crops respond fairly well to recommended applications of lime and fertilizer. The major soils

of this association have moderate limitations of low natural fertility. The Kenansville soils have a moderate hazard of wind erosion in large open areas and moderate droughtiness. Dragston soils have a moderate limitation due to wetness. Conservation practices should be used that will combat these hazards. A system of surface and subsurface drainage is desirable on Dragston soils for crops needing a well drained condition.

The Kenansville soils have none to slight limitations to urban uses, except when used for unsurfaced roads. The loose sandy surface soils have moderate limitations for intensive traffic. Dragston soils have seasonal high water table that is a moderate limitation for use of the soils for septic tank filter fields.

6. PONZER-PAMLICO MUCK ASSOCIATION

This association consists of broad, smooth, flats at the heads of intermittent streams (pocosins). The areas of this association have very little natural drainage. The association makes up about 10 percent of the county. There are four areas. Three areas are along the northern boundary of the county and one is in the central part.

Ponzer and Pamlico soils are the major soils and make up about 75 percent of this association area. They are very poorly drained. The soils have black to very dark grayish brown muck surface layers, 12 to 50 inches thick. The muck has less than one-third fibers and overlies dark gray to dark grayish brown,

friable, mineral soils. Ponzer has a loamy layer underlying the muck layers and Pamlico has a sandy layer.

The remainder of this association consists chiefly of deeper mucks and Portsmouth, Hyde, Torhunta, Bayboro and Leon soils.

Nearly all of this association is in woods or burned over brushland. The few cleared areas are used for corn, soybeans and pasture. The Ponzer and Pamlico soils have severe limitations for nearly all agricultural uses. Chief limitations are fertility problems, severe wetness and difficulty of drainage, extremely acid, susceptible to burning when drained.

Ponzer and Pamlico soils have severe limitations for all urban uses because of the high water table and poor foundation for building streets and roads.

7. TIDAL MARSH ASSOCIATION

This association consists of smooth flat land bordering large bodies of water. The land areas have elevations between those reached by high tides and low tides. The areas of this association have only a minimum of surface drainage during low tides. The association makes up about 10 percent of the county. The two largest areas are on the northeast and east side bordering Pamlico Sound and four small delineations are on the southwest side of the county bordering Neuse River.

Tidal marsh land makes up almost all of this association. The land is very poorly drained and subject to inundation by tidewater. Tidal marsh soil consists of layers of gray silt loam and very fine sandy loam and dark brown muck.

The remainder of this association consists chiefly of soils of the Coastal Beach, Torhunta, Portsmouth and Bayboro series.

The association has less than 10 percent tree cover, no cultivated areas or important pastured areas. About 85 percent of the acreage is in Land Capability VIII and grows salt tolerant plants such as rushes, sedge and beach grasses. The soils of this association have severe limitations for agricultural, forestry and urban uses. The main limitations are (1) wetness and frequent flooding by high tides, (2) elevation is too low for subsurface drainage outlets and (3) alkaline soil reaction and soil water.

GENERAL SOIL MAP

LEGEND

1 LENOIR - CRAVEN ASSOCIATION

2 LEAF - BAYBORO ASSOCIATION

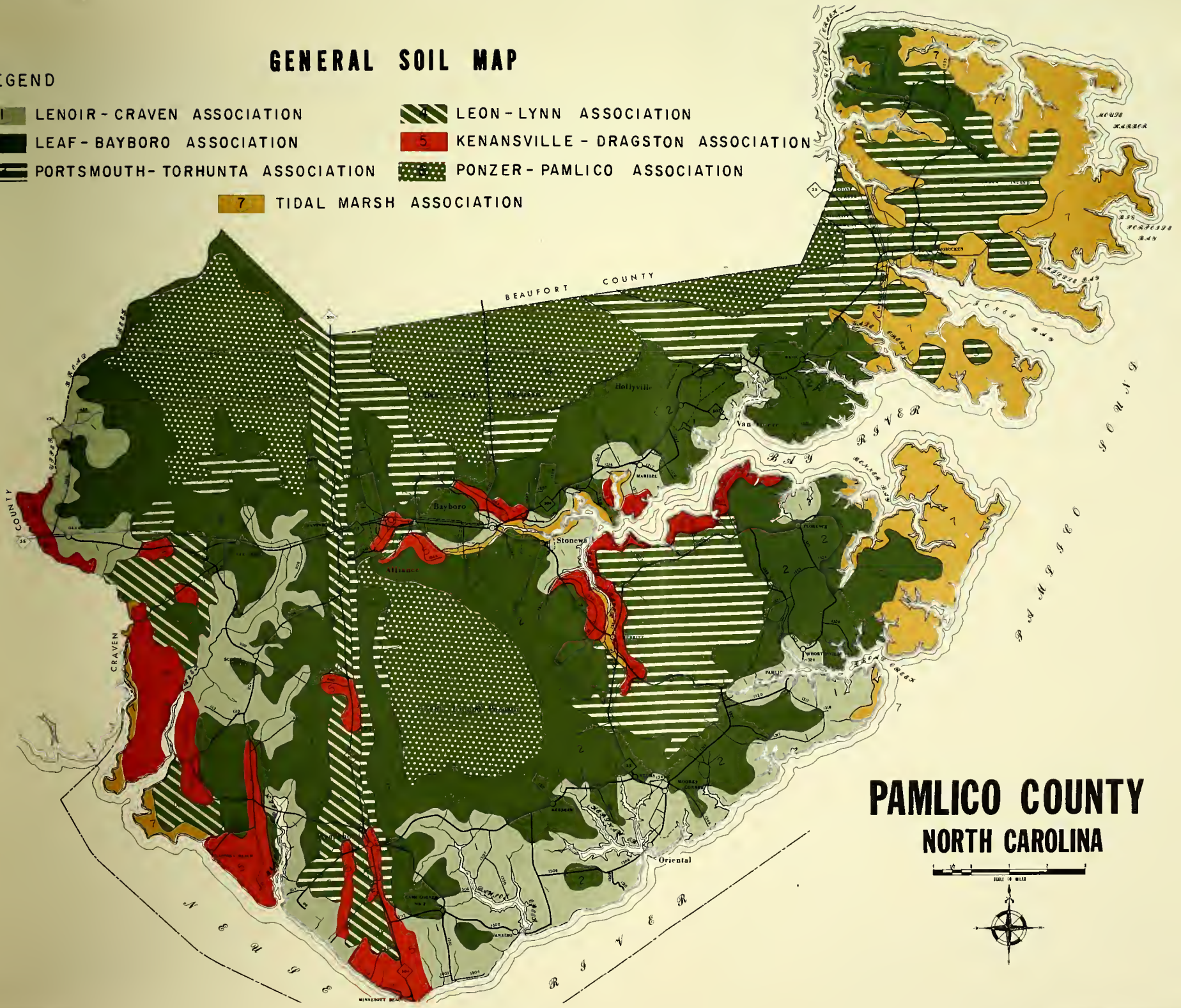
3 PORTSMOUTH - TORHUNTA ASSOCIATION

4 LEON - LYNN ASSOCIATION

5 KENANSVILLE - DRAGSTON ASSOCIATION

6 PONZER - PAMLICO ASSOCIATION

7 TIDAL MARSH ASSOCIATION



PAMLICO COUNTY

NORTH CAROLINA

TABLE 11

Soil Interpretations
General Soil Map
Pamlico County, N. C.

Soil Associations	Soils	% in Assoc.	LIMITATIONS FOR: Dwellings with: Sewerage Systems	Dwellings with: Septic Tank Filter Fields	Recreation: Camp Sites	Recreation: Picnic Areas	Recreation: Intensive Play Areas	Recreation: Light Industries[1]	Recreation: Roads and Streets[2]	Suitability for: General Agriculture	Suitability for: Woods
1. Lenoir-Craven (16% of county)	Lenoir	40	Mod(Wt,Sh-Sw)	Sev(Perc,Wt)	Sev(Wt,Traf)	Sev(Traf)	Sev(Traf)	Sev(Wt,Sh-Sw,Cor)	Sev(Wt,TSC)	Fair to Good	Good
	Craven	30			Mod(Traf,Er)	Mod(Traf,Er)	Mod(Traf,Er)	Mod(Sh-Sw,Cor)	Mod(TSC,Er)		
2. Leaf-Bayboro (24% of county)	Leaf	40	Sev(Wt,Sh-Sw)	Sev(Perc,Wt)	Sev(Wt,Traf)	Sev(Wt,Traf)	Sev(Wt,Traf)	Sev(Wt,Sh-Sw,Cor)	Sev(Wt,TSC)	Fair to Good	Good
	Bayboro	30									
3. Portsmouth-Torhunta (23% of county)	Portsmouth	40	Sev(Wt)	Sev(Wt)	Sev(Wt,Traf)	Sev(Wt,Traf)	Sev(Wt,Traf)	Sev(Wt,Cor)	Sev(Wt)	Fair to Good	Good
	Torhunta	20									
4. Leon-Lynn Haven (8% of county)	Leon	40	Sev(Wt,Prod)	Sev(Wt,Lfa)	Sev(Wt,Traf)	Sev(Wt,Traf)	Sev(Wt,Traf)	Sev(Wt,Cor)	Sev(Wt,TSC)	Poor	Poor
	Lynn Haven	25									
5. Kenansville-Dragston	Kenansville	30	Slt	Slt to Mod (Lfa)	Slt	Slt	Slt	Slt	Slt	Fair	Good
(7% of county)	Dragston	20	Mod(Wt)	Sev(Wt)	Mod(Wt,Traf)	Mod(Traf,Wt	Mod(Wt,Traf)	Mod(Wt,Cor)	Mod(Wt)	Fair to Good	
6. Ponzer-Pamlico (10% of county)	Ponzer	40	Sev(Wt)	Sev(Wt,Sh-Sw)	Sev(Wt,Traf)	Sev(Traf,Wt)	Sev(Traf,Wt)	Sev(Wt,Traf, Cor,Sh-Sw)	Sev(TSC,Wt, Sh-Sw)	Poor	Poor to Good[3]
	Pamlico	35									
7. Tidal Marsh (10% of county)		85	Sev(Fl,Wt)	Very Sev (Fl,Wt)	Very Sev (Fl,Wt,Traf)	Sev(Fl,Wt,Traf)	Very Sev(Fl, Wt,Traf)	Very Sev(Fl,Wt, Cor,Sh-Sw)	Very Sev(Fl, Wt,Cor,Sh-Sw)	Very Poor	Very Poor
			Slopes > 10% impose limitations; 10-25% - Mod.; 25%+ - Sev.	Slopes > 10% impose limitations; 10-15% - Mod.; 15%+ - Sev.	Slopes > 6% impose limitations; 6-10% - Mod.; 10%+ - Sev.	Slopes > 10% impose limitations; 10-25% - Mod.; 25%+ - Sev.	Slopes > 6% impose limitations; 6-10% - Mod.; 10%+ - Sev.	Slopes > 10% impose sev. limitations	Slopes > 25% impose sev. limitations		

Abbreviations for Limiting Factors:

Fl - Flood hazard
Wt - Water Table
Traf - Trafficability
Sh-Sw - Shrink-swell potential
R - Rock
Perc - Percolation rate
Cor - Corrosion potential
TSC - Traffic supporting capacity
Prod - Productivity
AWC - Available water capacity
LFa - Low filtering action

Abbreviations for degree of limitations:

Slt. - Slight
Mod. - Moderate
Sev. - Severe

1/ Structures whose footings are in subsoil.

2/ Refers to roads and streets that have subsoil for base.

3/ Oepends on thickness of the organic layer and acidity.

SOURCE: U.S. Department of Agriculture,
Soil Conservation Service, Raleigh, North Carolina

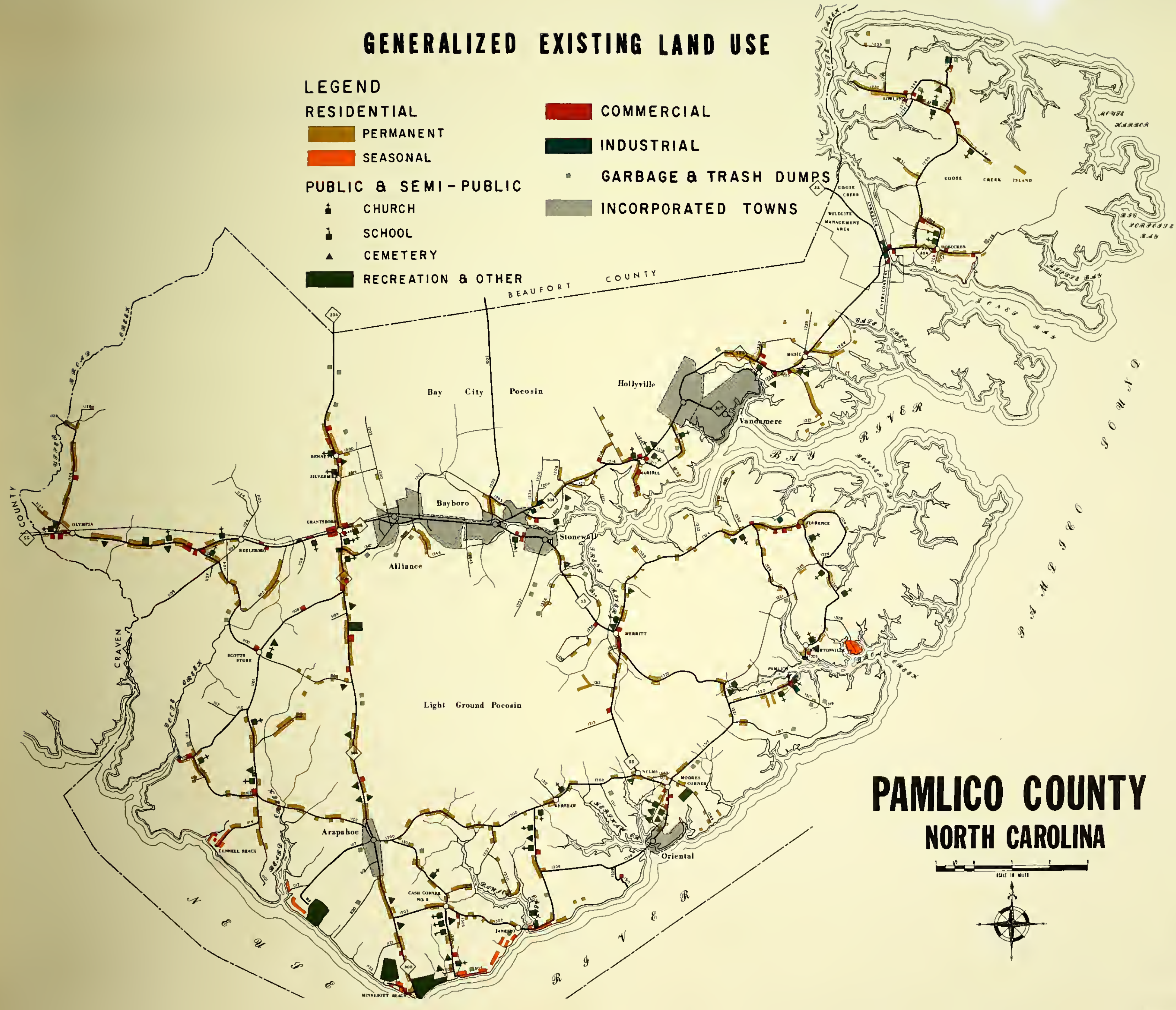
EXISTING LAND USE PATTERNS

In order to determine the extent and pattern of land use and to identify land use problems, a survey of all land use in Pamlico County was conducted in March of 1968. The land uses were divided into seven categories: residential, commercial, industrial, public and semi-public, agricultural, forestry, and swampland. A detailed land use map was produced from this survey, but it does not accompany this report due to its large size. In order to present this information on a smaller map, it was necessary to produce a generalized land use map which is shown on page 41 . The following is a discussion of the categories of land uses listed above.

Residential

Approximately 62% (6,170) of the population of Pamlico County lives outside of incorporated areas. The residential pattern is similar to the patterns that exist in most eastern North Carolina counties. Except for strip residential development along major roads and near towns, almost all the residences are agriculturally oriented and are single-family structures. Because Pamlico is a rural county, residential uses are evenly distributed over the entire county.

There are 2,489 residential units in the planning area of the county. Included in the above figures are 274 vacation homes and 132 mobile homes. Of the 274 vacation homes, 214 are cottages and 60 are mobile homes. These vacation homes are cluster-


GENERALIZED EXISTING LAND USE
LEGEND
RESIDENTIAL
PERMANENT
SEASONAL
PUBLIC & SEMI-PUBLIC
CHURCH
SCHOOL
CEMETERY
RECREATION & OTHER
COMMERCIAL
INDUSTRIAL
GARBAGE & TRASH DUMPS
INCORPORATED TOWNS
BEAUFORT COUNTY
CRAVEN COUNTY
Bay City Pocosin
Hollyville
Vandemere
Bayboro
Stonewall
Alliance
Grantsboro
Olympia
Reelsboro
Bennett
Silverhill
Scotts Store
Merritt
Florence
Pamlico
Light Ground Pocosin
Arapahoe
Kershaw
Oriental
Moores Corner
Minnesott Beach
Cash Corner No. 2
Janeiro
Kennell Beach
Lowland
Hobucken
Mesic
Goose Creek Island
Wildlife Management Area
Intracoastal Waterway
Bay River
Neuse River
Pamlico Sound
PAMLICO COUNTY
NORTH CAROLINA
SCALE IN MILES

ed in various waterfront locations along the Neuse River. These waterfront developments present several problems to the county. For the most part, they are located on small, odd-shaped lots with narrow streets or paths for access. These small lots are usually inadequate for the proper operation of septic tanks; as a result, a health problem is present.

During the land use survey taken in March of 1968, residential uses were evaluated according to their structural conditions and environment and were assigned one of three ratings. The three ratings assigned are as follows:

(1) Standard: Dwelling units which are average or above average and need only normal maintenance to retain their present status.

(2) Deteriorating: Dwellings in need of rehabilitation to prevent further decline, requiring structural alteration or extensive repair work.

(3) Dilapidated: Dwelling units which have deteriorated to the point where it would be uneconomical to restore them.

Shown in the following table are the physical conditions of the homes in Pamlico County. Mobile homes and vacation homes are not rated because mobile homes are difficult to judge, solely from external appearances, and because vacation homes are only occupied for a few months out of the year.

HOUSING CONDITIONS
(Planning Area)

	Number	Percent
Standard	710	34
Deteriorating	888	43
Dilapidated	485	23
	2,083	100

As shown in the table above, 66% of the houses in the planning area are substandard. Even though the above housing conditions are comparable to housing conditions in other rural counties, they are still unfavorable.

Commercial

Commercial establishments in the county are relatively few and consist mostly of service stations, grocery stores, and general stores. These uses are usually located at crossroads throughout the county or are intermingled with residential uses along highways. Rural residents demanding specialized commercial services either shop in Alliance, Bayboro, or in New Bern.

Industrial

Industrial uses in the county are very few in number and small in operation. Of the twelve manufacturing establishments in the county, eight are associated with seafood processing and four with the timber industry. There is no concentration of industrial uses. Most of them are located on inlets near the large bodies of water.

Public and Semi-Public

Included in this category are cultural, recreational, and governmental land uses. The major cultural land uses are churches, cemeteries, and lodges. Churches and cemeteries are numerous and scattered over the entire county. Churches are usually in good condition and are maintained adequately. Some cemeteries present an aesthetic problem, however, because of the lack of upkeep. This usually occurs in the small cemeteries or gravesites.

Wildlife management areas account for most of the governmental land uses. Other uses assigned to this category are North Carolina State Highway garages and storage areas as well as schools. Most of the schools in the county are located in incorporated areas due to school consolidation in the county. Only one school, Pamlico Central, is located in the county planning area. The Pamlico County Technical Institute, which serves all of the county, is located in Alliance.

Recreation facilities in Pamlico County are commercial in nature. Other than the many outdoor recreation activities such as hunting, fishing, and water sports, there are several summer camps in the county. Among these facilities are Camp Sea Gull, Camp Seafarer, Camp Don Lee, and Camp Caroline. Camp Sea Gull and Seafarer are owned and maintained by the Y.M.C.A., the former utilized by boys and the latter by girls. Camps Don Lee and Carolina are also maintained by Church organizations.

In addition to the above recreation facilities, a modern golf and country club is in the process of being constructed near Minnesott Beach. The golf course will be of championship caliber, with 18 holes having a total length of 7,000 yards.

Agriculture and Forestry

Pamlico County contains approximately 218,200 acres of land area. The N.C. Department of Agriculture, Crop Reporting Service, estimates that in 1967, 73,719 acres were devoted to farmland uses. The breakdown of farmland uses in 1966 and 1967 is shown in the table below.

FARMLAND USES, PAMLICO COUNTY, 1966-1967

	Acres	
	1966	1967
Harvested cropland	26,555	27,576
Idle cropland	4,452	4,310
Improved pasture	2,918	2,797
Unimproved open pasture	137	242
Woodland and all other	40,656	38,794
	74,718	73,719

As the table above indicates, farmland decreased slightly from 1966 to 1967. However, it is significant to notice that while most farmland uses decreased, harvested cropland increased from 26,555 acres to 27,576 acres. This is especially important because farming is such an important source of income in

Pamlico County. Grain, tobacco, potatoes, livestock, and poultry are currently the principal farm income sources.

Commercial forestland occupies more land than any other land use in the county. The Division of Forestry, North Carolina Department of Conservation and Development, estimates that there are approximately 143,300 acres of commercial forestland in Pamlico County. This amounts to about 65% of the land area in the county. Forestry, like agriculture, is another important source of income in the area.

Transportation

The transportation network of Pamlico County is comprised of highways, railways, and waterways. Each of these transportation systems is discussed below.

The county's highway system consists of N.C. Highways 55, 306, 307, 304, 33, and numerous secondary roads. The lack of connection of many of the above highways with highway facilities in surrounding counties is one of the most acute problems that confronts the development of the area. The table on the following page lists the types of highway facilities, their condition, and the miles that exist in the county.

HIGHWAY MILEAGE, PAMLICO COUNTY

State Maintained

Type	Miles
Primary	
Paved rural	49.29
Unpaved rural	---
Paved municipal	10.07
Unpaved municipal	---
Total	59.36
Secondary	
Paved rural	99.8
Unpaved rural	94.2
Paved municipal	5.94
Unpaved municipal	3.34
Total	203.28

Rail service is provided in the county by the Norfolk-Southern Railroad. The county is served by a spur line that terminates at Bayboro. Only freight service is provided and trains serve the county on an average of one to two times per week.

Air transportation is not available in the county. The nearest commercial airport is in New Bern. The airport is served by Piedmont and Eastern Airlines with 28 flights per day. Water transportation for the county is numerous because of its geographical location. The county is served by the Intracoastal Waterway where a 12' channel is maintained. This transportation facility is used heavily by pleasure craft and by barges transporting bulk cargo.

Utilities

The utilities serving the county consist of electric power and telephone service. Natural gas and community water and sewer service are not available. Electric power is furnished by the Pamlico-Beaufort Electric Membership Corporation and by the Carolina Power and Light Company. The Electric Membership Corporation serves the rural areas in the county while Carolina Light and Power Company serves municipal areas. Industrial rates are available. Telephone service is provided by Carolina Telephone and Telephone Company.

LAND POTENTIAL SUMMARY

As stated in the introduction of this report, the purpose of a Land Potential Study is to determine those physical, topographical, and cultural features of the county that create a potential for or will influence future development. The types of development considered are residential, industrial, commercial, agricultural, forestial, or recreational types of land uses.

Factors restricting development in the county are highway transportation, soils, topography, and the scattered land use patterns. Probably the most restrictive factor to development is inadequate highway transportation. Because Pamlico County is a peninsula surrounded by large bodies of water that are unbridged, its highway system is only connected to the N.C. State highway system in the western part of the county. As a result, no tourist or interstate traffic goes through the county. This isolation also makes truck transportation expensive. All products being shipped in and out of the county in a north-south direction must be transported from 30 to 40 extra miles to reach their destination. In addition, county residents working in surrounding areas must travel many extra miles. Because of the transportation problems mentioned above, there is a pressing need for a bridge extending N.C. 306 from Wilkinson Point across the Neuse River to Cherry Point in Craven County. With the construction of such a bridge, the southern part of the county would have great potential for residential development to serve the Cherry Point area.

Two other factors which limit development in the county are soils and topography. Nearly all the soils have characteristics which limit the uses that can be made of them. Some soils limit residential development because of poor percolation while other soils limit industrial development because of their poor load-bearing capacity. The topography of the area also restricts development. The level land surface creates poor drainage which, in turn, produces large bogs, and pocosins.

In addition to the above features which limit its development, Pamlico County has several features which create a potential for development. One of these factors is the availability of land. Because the county is rural and sparsely populated, much undeveloped land is available.

Another factor which creates a potential for development is the warm and temperate climate. More than ever, industrial concerns are placing emphasis on such factors as climate when selecting industrial sites. In addition, the climate is conducive to the development of recreation facilities.

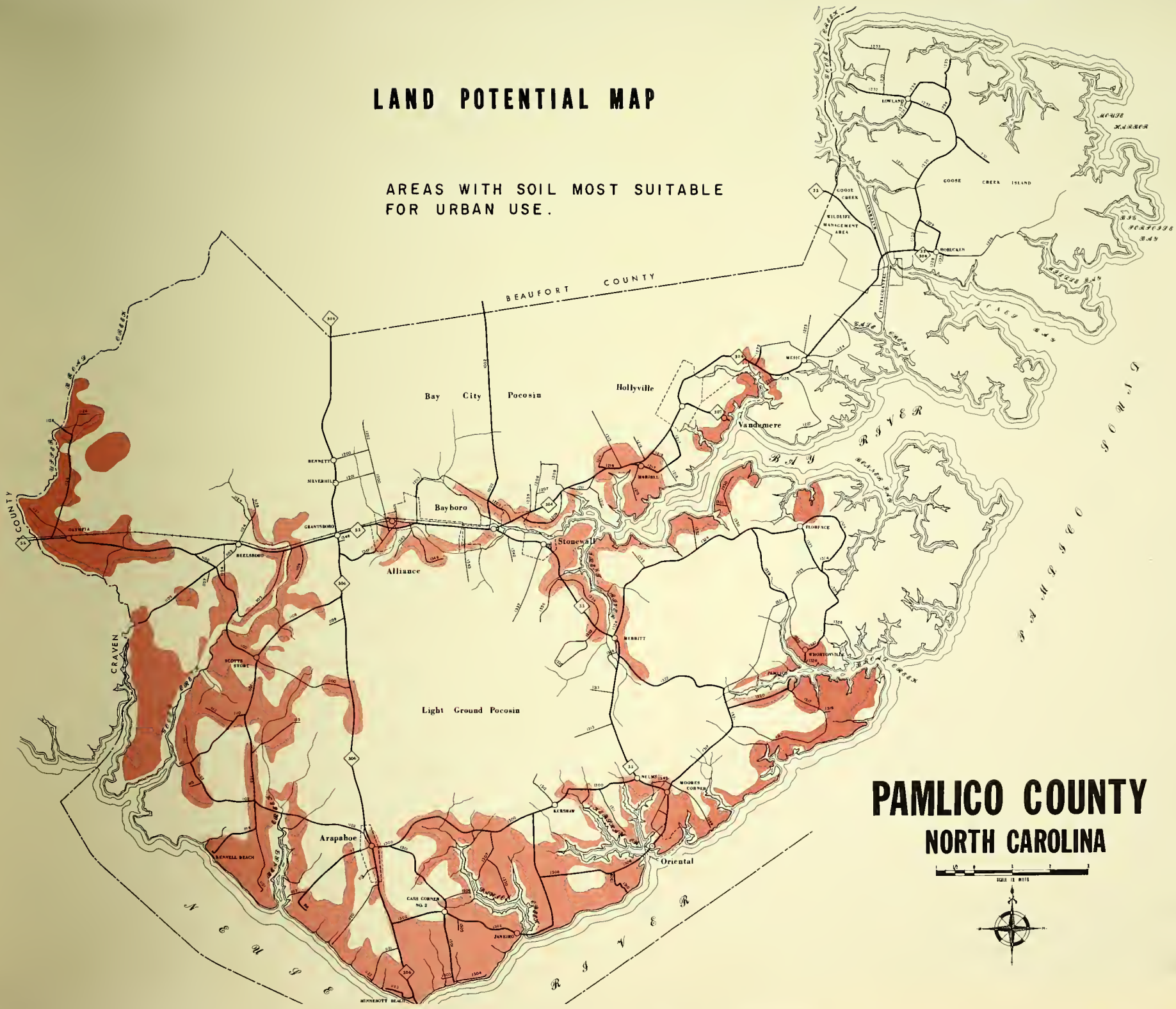
Still other features which create a potential for development are ground water, surface water, and soils. For the most part, ground water is available in large quantities with adequate quality. Surface water creates a potential in several ways. First of all, it has great potential for the expansion of existing recreation activities such as boating, fishing, bathing, and hunting for waterfowl. Also, it is a good source of supply for the commercial seafood industry. Although soils have character-

istics which limit their potential for many nonfarm uses, they are very suitable for agriculture and forestry.

After considering the above factors that either restrict or create potential for development, a Land Potential Map was produced. This map indicates the areas of the county that are most suitable for urban type development, namely, residential, commercial, industrial, and recreational uses.

LAND POTENTIAL MAP

AREAS WITH SOIL MOST SUITABLE
FOR URBAN USE.



PAMLICO COUNTY
NORTH CAROLINA